

but my experience was that Entomostraca seldom occurred in those pools in which the water was foul from decaying leaves. Generally, however, the water is very pure, and a kind of fine peat is deposited by slow decay of the leaves, as has been described by Picado*. Contrary to Mr. Scourfield's experience, I found other species, both of Cladocera and of Copepoda, in these holes, though *M. arboricola* was the only species met with as a rule. For instance, in one hole the following species were found, in addition to *M. arboricola*:—*Alona affinis*, *Chydorus ovalis*, *Chydorus sphaericus*, and *Canthocamptus pygmæus*, while another large hole contained only *C. pygmæus* in abundance. On one occasion a few specimens of *Candona pratensis*, Hartw., were met with in a hole near Burley †.

The most remarkable discovery, however, was made in a pool at the root of a beech-tree at Burley. In this pool were a number of *M. arboricola*, and among them were three specimens of *Tachidius brevicornis*, Lillj.—two young and an egg-bearing female. The occurrence of this littoral and brackish-water species in such a situation is extraordinary and unaccountable, since the water in these holes must be pure rain water, and Burley is over six miles from the sea. In the East Norfolk rivers, where there is a mingling of marine forms with those from fresh water, *T. brevicornis* has never been found beyond the reach of salt water, though *T. littoralis*, Poppe, penetrates sometimes into quite fresh water. No chemical analysis of the water in these tree-holes has been made, but it is possible that it may become rather highly concentrated by evaporation without drainage. That is a question which might be worth investigation.

XLIX.—On Neotropical Bats of the Genus *Eptesicus*.

By OLDFIELD THOMAS.

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THE Neotropical species of the widely-spread genus *Eptesicus* are almost all members of the group of which "*E. hilairei*" (using for the moment the name best known for it) is typical—small delicately built bats quite different from the large heavily built *E. fuscus* of North America. The group represented by the latter, however, not only goes into Central

* Bull. Sci. France Belgique, (7) xlvii. 1913, pp. 215-360.

† E. Simon, Ann. Soc. Entom. France, (6) vi. 1886, p. 415, alludes to the occurrence of *Tanyrastix stagnalis*, Linn., in hollows in tree-roots.

America in the form known as *E. f. miradorensis*, but I am now able to record its presence as far into S. America as Merida, Venezuela, whence comes a bat which I may commence by describing.

Eptesicus fuscus pelliceus, subsp. n.

General characters very much as in *E. f. miradorensis*, All., of Mexico and Central America, but fur decidedly longer. Colour quite as in Guatemalan *miradorensis*, the dorsal hairs blackish for four-fifths their length, their ends glossy cinnamon; underneath paler, the ends dull buffy whitish. Hairs of back about 9 mm. in length.

Skull about as in *miradorensis*.

Dimensions of the type (measured on skin):—

Forearm 54 mm.

Third finger, metacarpus 50, first phalanx 19.5.

Skull: palato-sinual length 8.6; interorbital breadth 4.3; front of canine to back of m^3 7.5; front of p^4 to back of m^2 5.2.

Hab. Heights near Merida, Venezuela. Type from La Culata. Alt. 4000 m.

Type. Old female. B.M. no. 98. 7. 1. 28. Collected 20th June, 1897, by S. Briceño. One specimen only.

Turning now to the true lightly built S.-American species, there is a considerably larger number of names to be reckoned with than has hitherto appeared, as I find no less than fourteen described from different parts of the continent, some of these having been wholly neglected by modern writers. Indeed, the earliest one of all, *brasiliensis*, Desm., 1819, seems never to have been used, but should evidently supersede *hilarii*, I. Geoffr., 1824, for the comparatively large dark-coloured Brazilian species, with which it is probable that *derasus*, Burm., 1854, *arctoides* and *nitens*, Wagn., 1855, and *arge*, Cope, 1889, are all synonymous. Then it seems evident that *dorianus*, Dobs., 1885 (Misiones), is synonymous with *furinalis*, D'Orb., 1847 (Corrientes), with forearm 37–38 mm., while for the pale Ecuadorean and N. Peruvian coast-species I fear that *innocens*, Gerv., 1841 (Amotape, Piura), will have to supersede *espadae*, Cabrera, 1901 (Babahoyo). *E. melanopterus*, Jent., 1904, would be the name for the Guianan species (forearm 37–40 mm.), to which *chapmani*, Allen, 1915, is likely to be nearly related. Then *andinus*, Allen, 1915, would be the highly suitable name for a dark-coloured species which ranges down the Andean chain from N. Colombia to Peru, our most southern examples coming from Chanchamayo.

To this the following new Central-American form would seem to be most nearly related:—

Eptesicus chiriquinus, sp. n.

Allied to *E. andinus*, but with longer forearm and legs and fluffier fur.

Size, as gauged by skull, not exceeding that of *E. andinus*, but the forearm and legs are materially longer and the length of the trunk, as given by collector, is greater. Fur long, soft, fine and rather woolly, more so than in the rather straight-haired *andinus*; hairs of back about 8 mm. in length. General colour blackish brown, the lighter ends to the hairs of the posterior back short and little conspicuous. Under surface practically as dark as upper, therefore darker than in *andinus*. Membranes black throughout.

Skull about as in *andinus*, though the supraorbital edges are more sharply angular. Canines of normal slenderness, while in *andinus* they seem to be always comparatively short and broadly conical; but how far the difference may be an effect of wear I cannot be sure.

Dimensions of the type (the italicized measurements taken in flesh by collector):—

Forearm 46·5 mm.

Head and body 70; tail 50; ear 14. Third finger, metacarpus 43; first phalanx 16·5; lower leg and hind foot (c. u.) 28.

Skull, greatest length 16·2; zygomatic breadth 11·1; intertemporal breadth 4; breadth of brain-case 7·8; palatosinual length 7; front of canine to back of m^3 6·3; front of p^4 to back of m^2 4·2.

Hab. Chiriqui. Type from Boquete. Alt. 4000'.

Type. Adult male. B.M. no. 3. 3. 3. 1. Original number 90. Collected 6th April, 1902, by H. J. Watson. Presented by Oldfield Thomas.

This species is recognizable by its long forearm and legs as compared with *E. andinus* of Colombia. *E. propinquus*, Peters, with which Mr. Osgood has shown *E. guimeri*, Allen, to be synonymous, is also characterized by its much paler under surface and smaller teeth. The only other Central-American *Eptesicus* is *E. fuscus miradorensis*, a member of the quite different *serotinus* group.

Next we may take two closely allied species characterized by their large rounded and swollen skulls, very different from the rather low flattened skulls of the S.-American species hitherto known:—

Eptesicus montosus, sp. n.

A small *Eptesicus* with swollen and rounded skull.

Size about as in *E. brasiliensis*. Fur very long and fine, hairs of back about 9 mm. in length. General colour blackish brown, lightened on the posterior back by the Prout's brown of the tips of the hairs. Under surface also brown, the tips of the hairs paler brown. Ears and tragus apparently as in *brasiliensis*.

Skull, as compared with that of *brasiliensis*, conspicuously more swollen, higher in the brain-case, with much broader and quite unridged interorbital region, the whole skull less flattened and less ridged.

Molars apparently rather narrower transversely than in *brasiliensis*, their longitudinal diameter about the same.

Dimensions of the type:—

Forearm 43 mm.

Head and body 55; tail 43; third finger, metacarpus 40; first phalanx 13; lower leg and hind foot (c. u.) 26.

Skull: greatest length 15.6; condylo-basal length 15.2; basi-sinual length 12; zygomatic breadth 10.3; interorbital breadth 4.2; breadth of brain-case 8; vertical height, including bullæ, 7.6; palato-sinual length 6.2; front of canine to back of m^3 6; front of p^3 to back of m^2 4.

Hab. (of type). Choro, north of Cochabamba, Highlands of Bolivia, on the upper waters of the R. Mamoré. Alt. 3600 m.

Type. Adult male skin and skull. B.M. no. 2.1.1.1. Original number 1433. Collected 8th May, 1901, by P. O. Simons. Presented by Oldfield Thomas.

"Native name Chini."—*P. O. S.*

All the hitherto described South-American species of *Eptesicus* have a characteristically flattened skull with widely spread zygomata and narrow interorbital region, while this highland form differs by its much higher and more rounded skull. Attention is especially drawn to the great interorbital breadth and the vertical height of the brain-case.

This is the "*Vespertilio* sp.—*hilairei* group" of my paper on Mr. Simons's Bolivian collection*.

An allied species is

Eptesicus inca, sp. n.

Near *E. montosus*, but larger. Skull more heavily ridged. General characters of *montosus*, with similarly large inflated

* Ann. & Mag. Nat. Hist. (7) ix. p. 126 (1902).

skull and long soft fur. Colour, so far as can be judged on a spirit-specimen, much as in that species. Sides of muzzle much swollen, tumid, the edges of the nostrils not projecting. Ears rather large, their outer margin with a rounded basal lobule. Tragus large, straight, not bowed inwards, with low basal lobule. Wings to base of fifth toe. Last vertebra of tail exerted.

Skull larger than that of *montosus* and rather more normal in general shape, less rounded and swollen. Brain-case with well-defined sagittal ridge. Intertemporal breadth equally exceeding that of the ordinary species of the genus. Teeth rather large throughout.

Dimensions of the type (measured on the spirit-specimen):—

Forearm 46 mm.

Head and body 55; tail 44; ear 16; tragus on inner edge 6; third finger, metacarpus 39, first phalanx 16.

Skull: greatest length 16·2; condylo-basal length 15·9; basi-sinual length 13; zygomatic breadth 10·8; intertemporal breadth 4·5; breadth of brain-case 8; palato-sinual length 6·8; front of canine to back of m^3 6·3; front of p^4 to back of m^2 4·2.

Hab. Chanchamayo, Cuzco, Peru.

Type. Adult male in alcohol. B.M. no. 94. 8. 6. 1. Collected by J. Kalinowski. One specimen.

Along the coastal regions of Ecuador and N. Peru the members of this genus are brownish, approximating to Prout's brown, cinnamon-brown, &c.—in marked contrast to the more or less blackish *E. andinus* of Colombia and the higher grounds of the Andes. Specimens from Piura, Peru, are toptotypical of *innovius*, Gerv., while quite similar forms are in the collection from Eten, Peru, to the south, and Santa Rosa, Ecuador, further north, the Museum containing thirteen specimens in all. In these the forearm is about 37–38 mm. in length, and the skull 14·9 to 15·5 mm. *E. espadæ*, Cabrera, from Babahoyo, with forearm 38 and skull 15·4 mm. in length, must no doubt be considered the same form, as it is expressly stated to be very pale in colour.

But among our specimens are two from the island of Puna so much smaller than the others as to demand distinction:—

Eptesicus punicus, sp. n.

Colour as in *E. innovius*, but size, and especially skull, markedly smaller.

Upper surface Prout's brown, the bases of the hairs darker brown but not blackish. Hairs of under surface brown basally, broadly light drab terminally.

Skull in shape like that of *E. innoxius*, but much smaller.

Dimensions of the type (the italicized measurements taken in the flesh):—

Forearm 35 mm.

Head and body 42; *tail* 35; *ear* 13. Third finger, metacarpus 32.5, first phalanx 12.7; lower leg and hind foot 21.2.

Skull: greatest length 14.1; condylo-basal length 13.8; zygomatic breadth 9; intertemporal breadth 3.8; breadth of brain-case 7.1; mastoid breadth 7.6; palato-sinual length 11; front of canine to back of m^3 4.9; front of p^3 to back of m^2 3.7.

In the paratype the forearm is longer—37 mm.,—but the skull is of quite the same small size.

Hab. Puna Island, Gulf of Guayaquil. Type from Puna. Alt. 10 m.

Type. Adult male. B.M. no. 99. 8. 1. 1. Original number 1. Collected 1st November, 1899, by Perry O. Simons. Two specimens.

The type was the first mammal obtained by Mr. Simons on his historic collecting-trip down the Andean region of S. America.

Although in other respects quite similar to the neighbouring *E. innoxius*, the Puna bat is distinguishable by the small size of its skull and teeth.

Passing now further to the south, we have *E. furinalis* as the smaller species of Paraguay and the Argentine (Corrientes, Misiones, &c.), but the larger would seem to need a name:—

Eptesicus argentinus, sp. n.

The pale open-country representative of *E. brasiliensis*.

Size large, even larger on the average than in *brasiliensis*. Fur rather short, hairs of back about 5 mm. in length; the narrow naked area often running along the edges of the back and rump unusually wide and well marked. General colour above quite pale, the light ends to the dorsal hairs near buffy brown, therefore much paler than in the dark Brazilian forms. Under surface dull whitish, the hairs slaty with whitish tips, inguinal region white. Ears and membranes brown, not black.

Skull robust, flattened, well-ridged, the zygomata broadly expanded. Teeth large and heavy.

Dimensions of the type (the italicized measurements taken in the flesh) :—

Forearm 45·5 mm. (range in adults from about 43).

Head and body 67; *tail* 44; *ear* 18. Third finger, metacarpal 42, first phalanx 15; lower leg and hind foot (c. u.) 25.

Skull: greatest length 17·3; basi-sinual length 13·6; zygomatic breadth 12·5; intertemporal breadth 3·9; breadth of brain-case 8; palato-sinual length of front of canine to back of m^3 6·7; front of p^4 to back of m^2 4·5.

Hab. Corrientes. Type from Goya, on the Parana. Alt. 600'.

Type. Adult female. B.M. no. 98. 3. 4. 6. Original number 18. Collected 16th December, 1895, by R. Perrens. Presented by Oldfield Thomas. Eight specimens.

The combination of large size and comparatively pale colour will at once distinguish this species from any other in S. America.

Also in the Argentine, just to the south of Goya, there is another species which in size is at the opposite pole from *E. argentinus*, being about the smallest species in S. America:—

Eptesicus fidelis, sp. n.

Size very small, slightly smaller even than *E. diminutus* and *punicus*. Fur fairly long, hairs of back about 7 mm. in length; edges of wing-membranes hairy for about half a centimetre out from the body, in contrast to *E. argentinus*, where there is even a naked edging on the body itself; inter-femoral membrane and base of tail also hairy for about a quarter its length. Tail very short, even relatively to the small size of the animal; its extreme tip only exerted. Ears and tragus small, the inner edge of the latter slightly concave. General colour, so far as can be seen in a spirit-specimen, brown, not black, the ends of the hairs a little paler; under surface brown, with whitish tips to the hairs; membranes brown throughout.

Skull low, smooth, unridged, with comparatively broad intertemporal region and scarcely perceptible sagittal and lambdoid crests. Canines proportionally rather short.

Dimensions of the type (measured on the spirit-specimen) :—

Forearm 34 mm.

Head and body 50; tail 32; ear 12·5; tragus on inner edge 4·2; third finger, metatragus 29, first phalanx 11; lower leg and hind foot (c. u.) 19·5.

Skull: greatest length 13·9; basi-sinual length 10·7; zygomatic breadth 9·8; intertemporal breadth 4; breadth of brain-case 7·3; mastoid breadth 8·1; palato-sinual length 5·5; maxillary tooth-row 5; front of p^4 to back of m^3 3·2.

Hab. Santa Fé Province, Argentine. Type from Esperanza.

Type. Adult male in alcohol. B.M. no. 1. 2. 4. 1. Collected by E. Lindner. One specimen.

Just a shade smaller than the two smallest species known—*E. diminutus*, Osg., of Bahia, and *E. punicus*, of Puna,—and distinguishable from both, apart from geographical considerations, by its comparatively broad intertemporal region, which forms a much less well-marked waist to the skull. All other described species are decidedly larger.

Lastly, in Brazil we have the large dark *E. brasiliensis*, Desm., found from the Amazon to Rio Grande do Sul, while the little *E. diminutus*, Osg., is as yet only known from the Rio Preto, Bahia.

L.—On the Group of African Zorils represented by *Ictonyx libyca*. By OLDFIELD THOMAS and MARTIN A. C. HINTON.

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IN connection with the determination of a Western specimen of this group we have noticed not only that the group itself contains a larger number of species than has been recognized, but also that its characters—as contrasted with the *capensis* group—are so much weightier than has been previously observed that it clearly ought to be separated as a distinct genus from the ordinary Zorils, to which all the previously existing names are referable. Consequently a new name is needed for the *libyca* group.

PÆCILICTIS, gen. nov.

Genotype, *P. libyca* (*Ictonyx libyca*, Hempr. & Ehr.).

Skull shortened; greatly expanded across the mastoid region. Bullæ hypertrophied.

Palms and soles hairy except on the actual pads, the region between the pads naked in *Ictonyx*; pads themselves smaller, more sharply defined and separate than in that genus.

Pattern of coloration about as in *Ictonyx*, except that the